

CLAIMS

1. A food preparation device comprising:

5 a first water chamber for holding a volume of water to be boiled thereby to produce boiled water; and  
a second water chamber arranged to receive said boiled water and to hold said boiled water prior to:  
(a) the reheating of said boiled water, thereby to produce reheated water; and  
10 (b) the dispensation of said reheated water to a mixing location at which it can mix with concentrated food preparation formulation.

2. A device as claimed in claim 1, wherein the first water chamber is associated with a first water heater operable to boil said volume of water.

15 3. A device as claimed in claim 2, wherein said first water heater is operable to boil said volume of water whilst said volume of water is held in said first water chamber.

20 4. A device as claimed in claim 2, wherein said first water heater is operable to boil said volume of water between when it leaves said first water chamber and when it arrives in said second water chamber.

25 5. A device as claimed in any one of the preceding claims, wherein said second water chamber is associated with a second water heater operable to reheat said boiled water.

30 6. A device as claimed in claim 5, wherein said second water heater is operable to reheat said boiled water whilst said boiled water is held in said second water chamber.

7. A device as claimed in claim 5, wherein said second water heater is operable to reheat said boiled water between when it leaves said second water chamber and when it arrives at said mixing location.

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8. A device as claimed in any one of claims 5 to 7, wherein said second water heater is restricted to reheating said boiled water to a predetermined maximum temperature below boiling.

10 9. A device as claimed in claim 8, wherein said predetermined maximum temperature is substantially below boiling, for example, in the region 45°C - 55°C.

15 10. A device as claimed in any one of the preceding claims, wherein said first water chamber has a first internal volume and said second water chamber has a second internal volume, said second internal volume being smaller than first internal volume.

20 11. A device as claimed in any one of the preceding claims, further comprising a third water chamber wherein said second water chamber is arranged to receive said boiled water from said first water chamber via said third water chamber.

25 12. A device as claimed in claim 11 when dependent from claim 10, wherein said third water chamber has a third internal volume and said third internal volume is greater than said second internal volume.

30 13. A device as claimed in any one of claims 1 to 10, wherein said second water chamber is arranged to receive said boiled water indirectly from said first water chamber.

14. A device as claimed in any one of the preceding claims, further comprising a flow controller to regulate the entry of said boiled water into said second water chamber.
- 5 15. A device as claimed in claim 14, wherein said flow controller includes a vent through which air is displaced from said second water chamber when said boiled water enters said second water chamber, said vent being constructed and arranged to prevent over filling of said second water chamber.
- 10 16. A device as claimed in claim 15, wherein said vent includes an inlet which is arranged to be blocked by boiled water in the second water chamber once the chamber contains a predetermined desired volume of said boiled water.
- 15 17. A device as claimed in any one of claims 14 to 16, wherein said second water chamber includes a water outlet through which water is dispensed from said second water chamber and said flow controller comprises a water inlet through which said boiled water enters said second water chamber.
- 20 18. A device as claimed in claim 17, wherein said water inlet and said water outlet are at generally opposite ends of said second water chamber.
- 25 19. A device as claimed in claim 17 or claim 18, wherein the maximum flow rate of said boiled water through said inlet is regulated by said flow controller to be less than the maximum flow rate of the said water through said outlet, so that when dispensing water from said second water chamber via said outlet the level of water in said second water chamber will drop.

20. A device as claimed in any one of claims 17 to 19, wherein said flow controller includes a weir arrangement at said water inlet, over which weir said boiled water is required to pass upon entering said second water chamber.
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21. A device as claimed in any one of the preceding claims, further comprising a bottle-receiving station for receiving a bottle and for the controlled discharge thereto of said reheated water.
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22. A device as claimed in claim 21, when dependent from claim 10, wherein the size of said second internal volume is generally equivalent to the volume of a bottle received in said bottle-receiving station.
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23. A device as claimed in claim 22, wherein the size of said first internal volume is generally equivalent to at least twice, preferably at least three times and more preferably at least four times, the volume of said bottle.
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24. A device as claimed in any one of claims 21 to 23, wherein said bottle receiving station is coincident with said mixing location.
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25. A device as claimed in claim 24, further comprising a weighing apparatus associated with the bottle-receiving station to determine the weight of concentrated food preparation and/or said reheated water dispensed to said mixing location.
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26. A device as claimed in claim 25, further comprising a microprocessor controller for regulating the dispensing to the mixing location of concentrated food preparation to match the amount of said reheated water dispensed or *vice-versa*.
27. A device as claimed in any one of claims 1 to 23, wherein said mixing location is within the device.

28. A device as claimed in any one of claims 21 to 23, wherein said mixing location is within the device and upstream of said bottle-receiving station, so that the reheated water discharged to said bottle-receiving station is, in use, already mixed with concentrated food preparation formulation:  
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29. A device as claimed in any one of the preceding claims, wherein the size of said second internal volume is approximately 250 cc.  
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30. A device as claimed in any one of the preceding claims, further comprising a pressure-sensitive valve associated with said first water chamber, which valve is arranged to be open at the start of an operation to boil said volume of water and which is arranged to close as the pressure in said first water chamber reaches a threshold level as a result of the boiling therein of said volume of water.  
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31. A device as claimed in claim 30, wherein the first water chamber is so constructed and arranged that, when the pressure sensitive valve closes during boiling of said volume of water, the increased pressure in the first water chamber occasioned by said boiling will cause said boiled water to be expelled from the first water chamber to a further chamber.  
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32. A device as claimed in claim 31, wherein said further chamber is positioned above said first water chamber.  
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33. A device as claimed in claim 31 or claim 32, wherein a conduit runs from said first water chamber to said further chamber and said boiled water expelled from said first water chamber is arranged to pass along said conduit from said first water chamber to said further chamber.  
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34. A device as claimed in claim 33, wherein said conduit is a pipe having an inlet end and an outlet end, said inlet end being positioned generally in the region of the base of the first water chamber.
- 5 35. A device as claimed in claim 34, wherein said outlet end of said pipe is positioned above the base of said further chamber so as to prevent all of said boiled water expelled to said further chamber from said first water chamber from draining back into said first water chamber upon termination of an operation to boil said volume of water in said first water chamber.
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36. A device as claimed in any one of claims 31 to 35, when dependent from claim 11 or claim 12, wherein said further chamber is said third water chamber.
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37. A device as claimed in claim 11, or in any one of claims 12 to 36 when dependent from claim 11, wherein said third water chamber is formed by a portion of the device which is separable from a further portion of the device forming at least said first water chamber, whereby to enable said separable portion of the device to be removed for cleaning of said third water chamber and/or to provide access to said first water chamber for cleaning and/or replenishment of said volume of water to be boiled.
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38. A device as claimed in claim 37 wherein said separable portion of the device is arranged to function as a removable lid for the first water chamber.
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39. A device as claimed in claim 37 or claim 38, wherein when said separable portion of the device is removed from the device, the device is still capable of use to reheat boiled water from said second water chamber and to dispense said reheated water.
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40. A device as claimed in any one of claims 37 to 39, wherein when said separable portion of the device is removed from the device the device is incapable of being used to boil said volume of water in said first water chamber.
5. 41. A device as claimed in any one of the preceding claims, further comprising a formulation receptacle for containing a plurality of doses of said concentrated food formulation.
10. 42. A device as claimed in claim 41, wherein said formulation receptacle is removable from the device for recharging with said formulation and/or cleaning.
15. 43. A device as claimed in claim 41 or claim 42, wherein said formulation receptacle is a bulk receptacle for said preparation, from which bulk receptacle a dose of said formulation can be metered out at the time the dose is required to be delivered from the formulation receptacle to said mixing location.
20. 44. A device as claimed in claim 43, further comprising a formulation conveying unit, which unit is operable to remove formulation from the receptacle and convey it towards said mixing location.
25. 45. A device as claimed in claim 44, wherein said formulation conveying unit is arranged to remove and convey a maximum predetermined amount of said formulation per activation of said unit, said amount being substantially smaller than the size of a said dose of preparation.
30. 46. A device as claimed in claim 45, wherein operation of said formulation conveying unit is arranged to be controlled according to feedback relating to the amount of said formulation already conveyed to said mixing location.

47. A device as claimed in claim 46 wherein, when the feedback indicates that the amount of said formulation already conveyed to said mixing location is within one half of said maximum predetermined amount, said metering and conveying unit is arranged to be activated one further time and then stopped.

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48. A device as claimed in claim 40 or claim 41, wherein said formulation receptacle is arranged to contain a plurality of discrete pre-measured doses of said concentrated food formulation.

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49. A device as claimed in claim 48, wherein said receptacle comprises a main housing into which is fitted a divider, which divider divides the interior of the main housing into a plurality of compartments each for containing a said dose of said food formulation.

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50. A device as claimed in claim 48 or claim 49, wherein said receptacle comprises a plurality of discrete compartments, each said compartment being arranged to contain a single said dose of said preparation.

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51. A device as claimed in claim 50, wherein at least one wall portion of each said compartment is readily deformable so as to enable said deformation to be used to assist the exit of a said dose of concentrated formulation from its respective said compartment.

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52. A device as claimed in claim 50 or claim 51, wherein each said compartment is provided with an openable closure, which closure is arranged to resist the ingress of moisture into the interior of its respective said compartment when closed and to enable the exit of a said dose of concentrated formulation when open.

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53. A device as claimed in claim 52 when dependent on claim 51, wherein a single movement of an element of the device is arranged to deform a said compartment's wall portion and to open that same said compartment's openable closure.

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54. A device as claimed in any one of claims 48 to 53, wherein said discrete doses are sequentially accessible by relative indexing of at least part of the formulation receptacle and at least part of a preparation delivery path, said path being arranged to deliver a dose of said formulation to said mixing location.

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55. A method of preparing food from concentrated food preparation formulation using a food preparation device, the method comprising the steps of:

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- (a) boiling a volume of water in the device thereby to produce boiled water;
- (b) subsequently reheating at least some of said boiled water in a separate portion of the device to that in which the water was boiled thereby to produce reheated water;
- (c) dispensing said reheated water to a mixing location; and
- (d) mixing said dispensed water with said concentrated food preparation formulation at said mixing location.

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56. A method as claimed in claim 55, wherein the food preparation device is as claimed in any one of claims 1 to 54.

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57. A food preparation device, comprising:  
a formulation receptacle for containing food preparation formulation;  
a formulation dispenser for dispensing formulation from said receptacle to a mixing location;  
at least one water chamber for the controlled dispensation therefrom of water to the mixing location; and

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a water dispensation controller for controlling the dispensing of water from said at least one chamber to the mixing location;

wherein the device is, in use, adapted to contain a first volume of water and said water dispensation controller is operable to dispense to the mixing location only a portion of the first volume of water.

5           58. A device as claimed in claim 57, wherein the water dispensation controller is manually operable to allow for the manual dispensing of water.

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59. A device as claimed in claim 57, wherein the water dispensation controller includes a microprocessor controller.

15           60. A device as claimed in claim 59, further comprising a water flow measurement device for measuring the amount of water dispensed to the mixing location from said at least one water chamber.

20           61. A device as claimed in claim 60, wherein the water dispensation controller is arranged to control the dispensing of water to the mixing location according to the volume of water dispensed, as measured by the water flow measurement device.

62. A device as claimed in any one of claims 59 to 61, wherein the water dispensation controller is provided with a manual override to enable manual intervention in the dispensation of water.

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63. A device as claimed in any one of claims 57 to 62, further comprising a timer for timing the duration of water dispensation to the mixing location from said at least one water chamber.

30           64. A device as claimed in claim 63, wherein the water dispensation controller is arranged to control the dispensing of water to the mixing location according to timing information received from the timer.

65. A device as claimed in any one of claims 57 to 64, further comprising a bottle-receiving station for receiving a bottle and for the controlled dispensing thereto of both formulation and water.

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66. A device as claimed in claim 65, wherein said bottle-receiving station is provided at said mixing location, whereby formulation and water dispensed to the mixing location can be dispensed directly into a bottle received in the bottle-receiving station.

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67. A device as claimed in claim 66, wherein said bottle-receiving station is adapted to receive a bottle of a type suitable for administration of the dispensed water/preparation, when dispensed to and then mixed in the bottle, to a baby or infant directly from the bottle.

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68. A device as claimed in any one of claims 65 to 67, further comprising a weighing apparatus associated with the bottle-receiving station to determine the weight of water dispensed to the mixing location.

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69. A device as claimed in claim 68, wherein the water dispensation controller is arranged to control the dispensing of water to the mixing location according to weight information received from the weighing apparatus.

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70. A device as claimed in any one of claims 57 to 69, wherein said portion of the first volume of water is based on the amount of formulation conveyed or to be conveyed to the mixing location from the formulation receptacle.

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71. A device as claimed in any one of claims 57 to 70, wherein the formulation receptacle is arranged to contain a plurality of doses of said formulation and the formulation dispenser is operable to convey to the mixing location a single dose of said formulation.

72. A device as claimed in claim 71, wherein a dose of said formulation is an amount to provide a single feed to a baby or infant.

5      73. A device as claimed in claim 68 or claim 69, or any one of claims 70 to 72 when dependent from claim 69, wherein the formulation dispenser is arranged to control the dispensing of formulation to the mixing location according to weight information received from the weighing apparatus.

10     74. A device as claimed in claim 71 or claim 72, wherein the size of a dose of formulation is capable of being varied by a user of the device.

15     75. A device as claimed in claim 71 or claim 72, wherein the formulation receptacle comprises a plurality of discrete compartments, each for containing a dose of formulation, and the formulation dispenser is arranged to dispense to the mixing location the complete contents of at least one said compartment in a single formulation discharge operation.

20     76. A device as claimed in any one of claims 71 to 75, wherein said formulation receptacle is removable from the device for recharging with said formulation and/or cleaning.

25     77. A device as claimed in claim 71 or claim 72, wherein said formulation receptacle is a bulk receptacle for said formulation, from which bulk receptacle a dose of said formulation can be metered out at the time the dose is required to be delivered from the formulation receptacle to said mixing location.

30     78. A device as claimed in claim 77, wherein said formulation dispenser is operable to remove formulation from the receptacle and convey it towards said mixing location.

79. A device as claimed in claim 78, wherein said formulation dispenser is arranged to remove and convey a maximum predetermined amount of said formulation per activation of said unit, said amount being substantially smaller than the size of a said dose of preparation.

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80. A device as claimed in claim 79, wherein operation of said formulation dispenser is arranged to be controlled according to feedback relating to the amount of said formulation already conveyed to said mixing location.

10 81. A device as claimed in claim 80 wherein, when the feedback indicates that the amount of said formulation already conveyed to said mixing location is less than said maximum predetermined amount, said metering and conveying unit is arranged to be activated one further time and then stopped.

15 82. A device as claimed in claim 75, wherein said formulation receptacle comprises a main housing into which is fitted a divider, which divider divides the interior of the main housing into said plurality of compartments each for containing a said dose of said food formulation.

20 83. A device as claimed in claim 75 or claim 82, wherein at least one wall portion of each said compartment is readily deformable so as to enable said deformation to be used to assist the exit of a said dose of concentrated formulation from its respective said compartment.

25 84. A device as claimed in claim 83, wherein each said compartment is provided with an openable closure, which closure is arranged to resist the ingress of moisture into the interior of its respective said compartment when closed and to enable the exit of a said dose of concentrated formulation when open.

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85. A device as claimed in claim 84, wherein a single movement of an element of the device is arranged to deform a said compartment's wall portion and to open that same said compartment's openable closure.
- 5 86. A device as claimed in any one of claims 82 to 85, wherein said discrete doses are sequentially accessible by relative indexing of at least part of the formulation receptacle and at least part of a preparation delivery path, said path being arranged to deliver a dose of said formulation to said mixing location.
- 10 87. A device as claimed in any one of claims 57 to 86, wherein the formulation dispenser and the water dispensation controller are configured to match the amount of formulation and water dispensed to the mixing location so as to produce at the mixing location a predetermined amount of mixed food of a predetermined concentration of formulation to water.
- 15 88. A device as claimed in claim 87, wherein in order to provide said predetermined amount of mixed food, the formulation dispenser is arranged to dispense formulation to the mixing location, to be followed by the water dispensation controller dispensing water to the mixing location, the amount of water dispensed by the water dispensation controller being adjusted automatically by the device in accordance with the actual amount of formulation dispensed.
- 20 89. A device as claimed in any one of claims 57 to 88, further comprising a control for enabling a user of the device to adjust the weight of formulation required in order to make up a serving of mixed food preparation at the mixing location.
- 25 90. A device as claimed in any one of claims 57 to 89, further comprising a control for enabling a user of the device to adjust the weight of mixed

food preparation to be made up at the mixing location during a single mixing event.

91. A method of preparing food from concentrated food preparation formulation using a food preparation device, the method comprising the steps of:
  - (a) providing the device with a first volume of water;
  - (b) dispensing formulation from a receptacle associated with the device to a mixing location;
  - (c) dispensing to said mixing location only a portion of said first volume of water; and
  - (d) mixing said dispensed water with said dispensed formulation at said mixing location.
92. A method as claimed in claim 91, wherein the food preparation device is as claimed in any one of claims 1 to 54 and 57 to 90.
93. A food preparation receptacle for mounting in and/or on a food preparation device, the receptacle containing at least one discrete dose of concentrated food preparation formulation, which dose may be discharged from the receptacle on demand.
94. A device or receptacle as claimed in any one of claims 57 to 70 and 93, wherein the receptacle is a sachet.
95. A receptacle as claimed in claim 93, or in claim 94 when dependent from claim 93, wherein the receptacle includes a closure which is arranged to be opened by the device on demand, wherein the opened closure is arranged to permit said at least one dose to exit from the receptacle to a downstream mixing location.
96. A receptacle as claimed in claim 93, or in claim 94 when dependent from claim 93, wherein the receptacle includes a closure which is arranged to

be opened by the device on demand, wherein the opened closure is arranged to permit the entry into the receptacle of water to mix with said at least one dose at a mixing location within the opened receptacle.

- 5        97. A receptacle as claimed in claim 93, wherein the receptacle is adapted to contain a plurality of discrete doses of concentrated food preparation formulation.
- 10      98. A receptacle for mounting in and/or on a food preparation device and comprising at least two relatively movable parts, one said part defining a formulation discharge portion through which concentrated food preparation formulation may be discharged from the receptacle on demand, and the other said part at least partly defining a plurality of compartments for containing discrete doses of the formulation, a said dose being selectively dischargable from the receptacle in use by moving into registration the discharge portion and the compartment in which is contained the dose to be discharged.
- 15      99. A receptacle as claimed in claim 98, wherein said at least two parts are relatively rotatable.
- 20      100. A receptacle as claimed in claim 99, wherein said at least two parts are arranged to be relatively rotated by the food preparation device when the receptacle is mounted in or on the device.
- 25      101. A receptacle as claimed in any one of claims 98 to 100, wherein said at least two parts are moulded from plastics material.
- 30      102. A device or receptacle as claimed in any one of claims 57 to 76, 93 and 97 to 101, wherein the receptacle is dismountable from the food preparation device for refilling and/or replacement.

103. A device or receptacle as claimed in any one of claims 57 to 76, 93 and 97 to 102, wherein the receptacle is provided with a hub for mounting the receptacle in and/or on the food preparation device.
- 5 104. A device or receptacle as claimed in any one of claims 57 to 90 and 93 to 103, wherein the receptacle is provided with identification means indicative of one or more of the following:
  - (a) the nature of the formulation;
  - (b) the number of discrete doses contained within the receptacle; and
  - 10 (c) the size of said at least one dose.
105. A device or receptacle as claimed in claim 104, wherein the identification means is arranged to be read by a reader provided on the food processing device when the receptacle is mounted in and/or on the device.
- 15 106. A combination of the food preparation receptacle claimed in claim 93 and the food preparation device claimed in any one of claims 1 to 54 and 57 to 90.
- 20 107. A food container for use with a food preparation device as claimed in any one of claims 1 to 54 and 57 to 90, wherein the container comprises a bottle-like portion having a dose of concentrated food preparation formulation sealably received therein.
- 25 108. A container as claimed in claim 107, wherein the seal of the container is not re-sealable.
109. A container as claimed in claim 107 or claim 108, wherein the internal volume of the bottle-like portion is capable of being increased following unsealing.

110. A container as claimed in any one of claims 107 to 109, wherein the bottle-like portion of the container includes an expandable section, for example in the form of a concertina.

5 111. A container as claimed in claim 110, wherein the container is a bottle.

112. A combination of a food preparation device as claimed in any one of claims 1 to 54 and 57 to 90 and a container as claimed in any one of claims 107 to 111.